Dr. H. B. A. Kugeler: There is one point in connection with the Wassermann and luetin reactions that attention should be called to. My attention was called to it by Dr. Jones of the State Journal; I do not think he has pointedly called attention to it, but indirectly he has warned us of the dangers that will result from the Wassermann reaction. In a case in Los Angeles a man made a diagnosis of incipient tuberculosis; the patient was examined by someone else and was told that he had no tuberculosis and never had had it. The first physician was sued, and it cost the State Society a great deal of money for his defense. If a patient has a positive reaction from the Wassermann test, we are inclined to tell him that he has syphilis. The next man that takes his blood may not find it. It is a very dangerous thing to tell a patient that because of a positive Wassermann he has syphilis. I am just telling you this as a warning of the liability of suits that are going to happen to some of us if we are not more specific in our statements.

Dr. Harry E. Alderson: I would like to say that I have seen many of these reactions at the Stanford University clinics. Some of the cases observed by Dr. Wolfsohn came from the skin clinic, as he has stated. I have never seen a definite luetin reaction appear in a patient definitely known to be non-syphilitic. This corresponds with the experience of those who have worked with Noguchi since the beginning. The test is certainly of some value, especially in latent and in tertiary cases. I have in mind the case of a man who had syphilis, had been given thorough treatment by Professor Fordyce of New York, and was considered well. He reported to me occasionally for observation. I tried the luetin test and was surprised to obtain a positive reaction. Then I had his blood examined and the serologist reported a triple x Wassermann. This experience is met with occasionally. We get a positive luetin reaction where we do not expect it, and that leads us to look a little further for more evidence of lues, and sometimes we find that our search has been warranted. As for the reaction itself, the luetin lesion is something more than a papule—it is a definite nodule. There is definite induration extending under what you see on the surface, and there are all degrees of this induration. There is no difficulty in distinguishing the control from the luetin after observing the two for several days. In the majority of cases the control subsides in a short time; while the luetin reaction persists for a much longer period.

ENTERO-CLYSIS IN THE TREATMENT OF WEAK HEARTS.*

By DR. WM. WATT KERR, San Francisco.

Allow me to preface the following remarks by the statement that I am not going to suggest the use of colon lavage in all cases of weak heart action, but only in those instances where there is good reason to believe that the feebleness of the myocardium may be induced or increased by absorption of toxins from the alimentary canal, and even then the treatment is not capable of universal application.

Entero-clysis or colon lavage is an instance of a therapeutic method that has been productive of much evil, and even death, because it has been recommended indiscriminately by thoughtless physicians, or laymen, who are incapable of selecting suitable cases or recognizing favorable from unfavorable conditions for its administration, who at the best have a very hazy idea of the benefits and are absolutely ignorant of the dangers attendant upon such a treatment. The following description was given to me by a patient as a fair sample of a morning conversation that might be heard between the inmates of one or other of the various sanatoria where the lavage treatment is practised as a matter of daily routine:

"Good morning, Mrs. Jones. How much did you hold this morning?" "Oh, just a quart!" "Really! I took nearly three quarts, and Mrs. Smith can now hold a gallon; but I expect to do as well as she does before I leave for home."

And so the story goes, day in and day out, occasionally punctuated by some weak-hearted unfortunate having a suden copious evacuation of an overdistended bowel, followed by a syncope that brings him to a full stop. Nearly every one is more or less familiar with such incidents which deservedly warrant censure of the negligence and ignorance exhibited, but they should not bring the therapeutic method into disrepute.

Entero-clysis is practised in a great variety of diseases, but, so far as I am aware, little has been said or written about its use in relieving the distressing symptoms of patients suffering from cardiac weakness that is caused or aggravated by intestinal intoxication, either because the relation between the two conditions is occasionally overlooked, or the use of internal intestinal disinfectants, such as urotropin, salol and guaiacol is relied upon to check the process. All of those, however, are extremely uncertain in their action in the large bowel and, however useful they may be as adjuvants to the treatment, cannot be compared in efficacy to the immediate removal of the putrescent material.

In November, 1905, I visited Mrs. R., age 65, who complained that she could not lie upon her left side, and that she was awakened nearly every night by one or more attacks of palpitation. There was a sensation of weight in the epigastrium and a constant desire to inspire deeply. The pulse rate was 140, the cardiac apex was in the sixth space four and one-quarter inches to the left of the sternum, and on auscultation a blowing mitral systolic murmur was easily heard. The area of hepatic dullness was increased.

Every other night, for three doses, she was given two pills containing blue mass and compound rhubarb pill, and four times daily she received ten minims of the tincture of digitalis. At the end of forty-eight hours the pulse rate had dropped to 120 and the patient felt very much better, but after this the case dragged and for several days there was little or no improvement. One morning the nurse mentioned that, notwithstanding frequent and successful use of laxatives, the stool for the first time contained some dry scybalous pieces; consequently instructions were given to wash out the bowel with a warm saline solution every alternate morning, and upon the night preceding the lavage to introduce into the colon, through the long tube, about six ounces of sweet oil and to advise the patient to retain it all night if possible. After the third oil injection a very large quantity of dry fecal matter came away, and then each lavage showed less and less until at the end of about two weeks

* Read before the California Academy of Medicine, November 25, 1912.

the returning stream appeared to be normal. From this time on the oil was discontinued, but the saline lavage was used every fourth day for two weeks, after which time it was abandoned, and the patient was advised to take petroleum emulsion three times daily after food as well as the following capsule every night in the hope of preventing the feces from becoming dry and of increasing the intestinal tone:

℞

Ext: Physostigmat. grs. ii
Ext. Nucis Vom. grs. vi
Ext. Cascar Sagrad grs. xxx. Mix

Ft. mass et divide in capsules xii.

From the day that lavage was commenced the patient began to respond to treatment and improve. She remained perfectly free from cardiac discomfort until the beginning of this year when she had an attack of influenza, and this was followed by cardiac depression and intestinal atony that after a time yielded to a similar line of treatment, so that at the present time she is in perfectly good health for a lady of her age.

It is not necessary to mention other instances as this sufficiently illustrates the topic offered for discussion, but it may be of interest to recall some of the *data* upon which the treatment is based, as well as to refer to the type of cases that are most liable to be benefited by it.

The alkalinity of the colon makes it particularly well adapted to the growth and activity of the bacteria producing putrefaction in the proteids that have escaped digestion and absorption in the small intestine, and which in the process of putrefactive fermentation yield not only peptones and proteoses but also numerous terminal products such as indol, skatol, phenol and the animal alkaloids generally known as ptomaines, some of which are excreted in the feces while others are absorbed and, after undergoing farther change, are eliminated in the urine and bile.

Not infrequently we meet with acute symptoms due to the action of these toxins, but that possibly happens only when putrescent food containing such substances already formed in considerable quantities has been ingested; on the other hand the mental and physical lassitude, the occasional attacks of slow or intermittent pulse, palpitation and cold extremities, that are so frequently associated with intestinal indigestion, constipation or inactivity of the liver, all indicate that defective elimination or excessive formation can result in a slow chronic form of auto-intoxication.

The heart cases in whom I have seen the most marked benefit follow colon lavage are patients from sixty years of age and upwards where senile myocardial changes are beginning to make themselves felt, and where the growing inability or disinclination to exercise induces a loss of tone in the intestine so that, although actual constipation may not exist, the bowels never are thoroughly evacuated, and consequently a very favorable condition for putrefaction of the colon contents and auto-intoxication results. When a patient suffers from chronic constipation he is aware of his condition, and by the use of laxatives insures a daily clearance and thus may obviate the consequences of fecal retention. But there may be another reason which explains why those cardiac symptoms are more readily produced in people who have acquired a tendency to irregularity or imperfect evacuation of the bowels during the latter years of life than in those who have been constipated almost from childhood, and that is the well-known fact that a tolerance against the toxins of putrefaction appears to be established not only in individuals but in races. Thus it is notorious that the natives of Siam, as well as the Eskimo and other races, prefer to eat their fish and meat in a state of mal-odorous putrefaction, and some of the Chinese tribes regard rotten eggs as a delicacy, while the Zulu rises to the epicurean climax when he talks of heaven as "Ubomi," which being interpreted means "maggoty meat"; evidently he likes things very high. It is therefore evident that a tolerance of the common toxins of putrefaction is developed, and it is quite possible that this takes place slowly in those who have suffered from constipation from early life. Furthermore, if the liver becomes passively congested as a result of weak circulation, or if the hepatic cells are injured or exhausted by the specific character or excessive amount of the toxin absorbed into the portal circulation, then the liver will no longer be an effectual barrier against the introduction of toxins into the general circulation and constitutional symptoms may result.

As an illustration of the influence of intestinal toxins on the heart one cannot help thinking of the relations between the proteid alkaloid choline and the vegetable alkaloid muscarine.

The substance lecithin, which is present in varying quantities in many foods, and in large quantities in yolk of egg and brain tissue, is split up by the pancreatic juice into glycerin, phosphoric acid, fatty acid, and choline, which latter is highly toxic but is usually, as a result of bacterial action, eliminated as carbonic acid, menthane and ammonia. Choline resembles muscarine in its toxic effects and has been transformed into muscarine synthetically by a process of oxidation. Again, muscarine has been obtained from decomposed beef, so that the question naturally arises: Since choline is normally found in the intestine and can be transformed into muscarine, and since muscarine has been found in decaying beef, is it possible that under certain abnormal conditions, such as excessive formation or defective elimination of the former, or some perversion of metabolism, the transformation may take place within the human body? If such be the case then we can understand the symptoms in many chronic cases of auto-intoxication, because it is well known that muscarine depresses the motor power of the heart, causes slowing and finally cessation of the beat by stimulating the vagus, arrest finally taking place while the heart is in diastole.

In considering the advantages of colon lavage, the great absorptive power of the colon for water must be taken into account apart from the mere cleansing effect of the entering and returning streams, and since this is not associated with a corresponding watery secretion as is the case with the small in-

testine, the water that is retained in the colon, which is always considerable, is absorbed, flushes the tissues and circulation of many toxins that have been absorbed, and eliminates them by diuresis. This answers the criticism occasionally made that entero-clysis only cleanses the colon while it has no influence upon toxic conditions due to disturbance in the small intestine; moreover, it should be remembered that there are two reasons why lavage of the small intestine is not so imperatively demanded. First: While water is absorbed to a considerable extent from the small intestine there is a compensatory secretion of fluids into the bowel so that the contents remain equally liquid all the way from the pylorus to the ileo-cecal valve, and consequently there is not the same opportunity for stagnation as to the large bowel when absorption of liquid is so far in excess of secretion that the feces become dry and formed; indeed Noel Paton (Human Physiology 352) estimates that in the entero-hemal circulation of fluids about 3000 c.cm. of secretions, about half the volume of the blood, are poured into the intestine every day and almost entirely reabsorbed. Second: In the small intestine normally only those bacteria causing carbohydrate fermentation are particularly active, while in the large bowel protein putrefaction is a constant and normal occurrence. Lastly it may be asked: Since bacterial fermentation takes place normally in both large and small bowel, may we not by this process of lavage interfere with a physiological process to such an extent as to seriously interfere with nutrition? First it should be clearly understood that entero-clysis is not advised for healthy persons nor for every form of sickness, but only in those cases where there is distinct evidence of pathological processes resulting from intestinal putrefaction; and even then it is not to be used continuously but to be gradually discontinued as the special symptoms abate. I mention this because there are laymen, unfortunately countenanced by members of the medical profession, who find in colon lavage a panacea for all existing bodily ailments and a prophylactic against all imminent diseases, who consequently advocate its use in sick and well alike with as little compunction as they would order a foot-bath. Second: Physiological research has shown that "while the presence of the bacteria confers no positive benefit, the organism has adapted itself under usual conditions to neutralize their injurious action. According to Metchnikoff, on the other hand, the constant production and absorption of bacterial toxins from the intestine is one of the important causes of a loss of resistance on the part of the body to the changes which bring on senescence and death." (Howell's Physiology, 796.)

The amount of fluid used in an injection should never exceed one quart of warm salt solution at a temperature of 100° to 103° F., indeed smaller quantities are to be preferred because they do not distend the bowel, and their expulsion is not so liable to be followed by the faintness or syncope which occasionally ensues if the patient with a weak heart be allowed to suddenly expel a large quantity of liquid from the bowel, especially if he be the subject of aortic regurgitation. The weaker the heart the more urgent the necessity for limiting the amount of water to one pint, and for cautioning the patient to allow the return stream to escape intermittently instead of in a gush. The pressure should not be more than an elevation of six or nine inches above the patient's buttocks when he is lying on his right side with the knees drawn up; and if this invariably produces pain from spasm of the bowels or induces perspiration and faintness, then the treatment should be abandoned.

If the retention of much hard fecal matter be suspected, then the injections of oil alternating with water may be used as in the case reported.

It not infrequently happens that the injection does not return, and the nurse, after waiting for a short time, repeats the process with an equal or even larger volume of water in the belief that by distending the colon to a greater extent there will be a corresponding recoil and the bowel contents expelled. This should not be permitted as the retention indicates atony of the bowel and distention will simply increase this condition; it is very much better to wait for several hours, or until the next day, at least until the water has been absorbed and voided through the kidneys. At the same time if the patient be given a course of strychnine or nux vomica the tone of the bowel will in many instances be restored.

I feel that it is somewhat presumptuous on my part to mention such details in regard to the technic of colon lavage, but I do so to emphasize the fact that the attending physician not infrequently fails to give detailed instructions to the nurse who is carrying out the treatment, and unpleasant incidents result.

Discussion.

Dr. George Ebright: Even in the presence of good health it has long been recognized that overloading combined with sluggishness of action of the large bowel is a sufficient cause for disturbance in other parts of the body. If this is true in well people, it is natural that those who are suffering from some illness would be that much the more affected. The initial dose of calomel in acute illnesses bespeaks the recognition of this opinion. Where the illness is of a chronic nature it stands to reason that intestinal stasis must have its ill effect. The importance of this is, in chronic heart conditions, too much neglected. For a number of years I have found benefit follow the administration of teaspoonful doses of castor oil for five or six consecutive nights in chronic heart trouble associated with flatulence.

Dr. J. B. Frankenheimer: I would like to mention a certain instrument of torture that some people use. It is a rubber bag like a hot water bag, with a nozzle in the center on which the patient sits and regulates the pressure of the fluid which is forced into the rectum. The apparatus is advertised by a New York firm, and has a capacity of about 3 quarts. It is obvious that this is anything but an ideal method of taking an enema. I have had at least one case in which distension of the descending colon has occurred. Of course, this is not pertinent to the paper, but I would like to call the attention of the physicians present to this method so that precautions should be taken to describe to the patient the proper way of flushing the colon.

Dr. Kerr, closing discussion: I happen to have one or two patients who have adopted the use of the particular bag to which Dr. Frankenheimer referred. I have never seen the bag, have only

heard it described. My patients used it because there was no one to assist them in passing the large tube and in preparing the ordinary colon injection; but they seemed to get along pretty well and have even injected intermittently. One gentleman when in the country had to come down to this kind of thing or go without. He told me that if he used this form of injection rapidly it gave him pain, but by injecting a little, then turning the stop cock shutting it off, then injecting a little again, there was no pain. He never filled the bag more than quarter full and consequently suffered no inconvenience.

ORTHOPEDIC TREATMENT OF SPINAL POLIOMYELITIS.

By JAMES T. WATKINS, M. D., San Francisco.

The present paper was delivered in abstract before the California State Medical Society at Del Monte in April, 1912. The time limit set made it necessary to confine its scope to a consideration only of the principles governing the operative side of treatment. Here in the full text other, and if anything more important features of treatment are also given consideration. Occasional repetitions appear in the text where facts were deemed sufficiently important to warrant reiteration.

It may be accepted as finally determined that in spinal poliomyelitis we have to do with an infection which particularly attacks the nervous tissues. The characteristic lesion is a collar-like round cell infiltration of the adventitia of the blood vessels of these structures. The tendency of this round cell infiltration is to cause a diminution of the lumina of the affected vessels. In some instances they are obliterated. The degree and distribution of this vascular occlusion determines whether or not paralysis will supervene and, when paralysis does occur, whether it will be temporary or permanent.

We recognize an acute stage, or stage of invasion, a stage of recovery, and the final or end stage—that stage beyond which there will be no further improvement.

The opinion seems to prevail now that of those stricken with the disease from 20% to 25% either recover without paralysis or, after being paralyzed, recover from it. From a sixth to a third of the patients in different epidemics die during the acute stage of the disease of respiratory paralysis. The remaining victims are permanently crippled to varying degrees.

The medical treatment of spinal poliomyelitis remains at this writing unsatisfactory. Once the disease has progressed far enough to be recognizable, there is thus far no known remedy which will check an attack nor limit its distribution. It is, however, within the bounds of probability that eventually an efficient vaccine against the attacks of poliomyelitis may be evolved.

In the meantime orthopedic surgery holds out hopes of benefiting the patient in each of the three stages.

It is susceptible of demonstration that during the stage of invasion orthopedic surgery can, by immobilizing the spine, cause an amelioration of the sensory symptoms; and, reasoning by analogy from what we know of the influence of immobilization upon other spinal inflammations, it is probable that this procedure may also limit the spread of the disease. It is further susceptible of demonstration that during the second stage, that of recovery, orthopedic surgery may advantageously be employed to conserve and to develop to the utmost all of whatever muscle substance may have been spared by the ravages of the disease.

Again, in all three stages orthopedic surgery is invoked to prevent deformity, or, if deformity be present, to correct it. Finally in the third and last stage, orthopedic surgeons aim by a judicious redistribution of whatever muscular power may be left to re-establish the muscular balance about a joint and to reconstitute the function of the limb.

The Stage of Invasion.

A distressing feature of the later epidemics of spinal poliomyelitis has been the very severe pain which obtained throughout the stage of invasion. This signified that we had no longer to deal with an *anterior* poliomyelitis only, but that the sensory tracts had also been invaded.

For some time it has been recognized that acute inflammations of joints are best treated by immobilization. It remained for the neurologist Oppenheim, however, to suggest that this principle of treatment might advantageously be applied to cases of poliomyelitis. Acting upon this suggestion, Lange of Munich, in 1909, demonstrated that "children ill with poliomyelitis and suffering severe pain in the spinal column, became free from pain on the application of a plaster of paris jacket which embraced the entire trunk." And, as was noted above, it seemed to him indeed probable that this immobilization hindered the spread of the inflammatory process throughout the cord.

The most efficient fixation apparatus, and one, too, which would maintain the feet in the proper relation to the legs, was the plaster of Paris bed which the writer saw employed at the Instituto Rizzoli in Bologna. This was constructed by placing the patient with the body in slight hyperextension while the arms and thighs were maintained slightly abducted, the forearms and legs slightly flexed, and the feet at right angles to the legs and a little inverted. In this position, after being generously padded, they were individually encircled with plaster of paris bandages to a uniform thickness of one-quarter inch. The occiput was also included. When it had set this plaster of paris mold was cut through all around in a frontal plane. In this way a bed with an anterior and posterior valve was devised. Each valve was subsequently reinforced with more plaster and spanners of light wood. The plaster was cut away under the buttocks sufficiently to make room for the action of the emunctaries.

To perform the toilet of the back the accurately fitting anterior valve could be applied and then the entire appliance with the child in place, turned over upon its face. The patient would lie quietly then in the anterior valve while the posterior valve was removed to facilitate the cleansing and powdering of the skin.

For practitioners not sufficiently expert in the use of plaster of paris to construct this bivalve plaster-bed, the use of the long plain plaster of paris jacket is to be recommended. The gas-pipe and canvas frame bent backward and made more efficient by sand bags about the patient also offers a vast improvement over the ordinary bed and pillows.